Highlights from the 2017 Forest Health Surveys of the Black Hills Area of South Dakota

Aerial survey of the Black Hills of South Dakota and northeastern Wyoming reveals mountain pine beetle populations continue at endemic (low) levels. Approximately 2,900 acres in the Black Hills N.F and vicinity in South Dakota experienced trees fading from mountain pine beetles and ips engraver beetles (Figure 1). Across the entire Black Hills National Forest including portions of Wyoming, 4,700 acres of ponderosa pine mortality due to bark beetle were detected.

Data collected in 2017 was done by aerial sketchmapping by trained observers. From 2010 – 2016, surveys were conducted using high resolution aerial photography. As mountain pine beetle levels have declined, there is less need for the more labor intensive and costly photo acquisition and interpretation. Traditional aerial survey is a less precise technique and numbers can be misleading when compared to numbers derived by photo interpretation.

The most recent epidemic lasted about 20 years from 1996 to the return to endemic levels in 2016. Approximately 450,000 affected acres were detected by combining both survey techniques on the Black Hills National Forest and adjacent lands through 2017 (Figure 2).

Figure 1. Declining mountain pine beetle numbers are characterized by scattered individual tree mortality rather than hillsides of fading trees. Some mortality may be due to pine engraver beetles as well as mountain pine beetle. Photo: Kurt Allen, USDA Forest Service 2017.

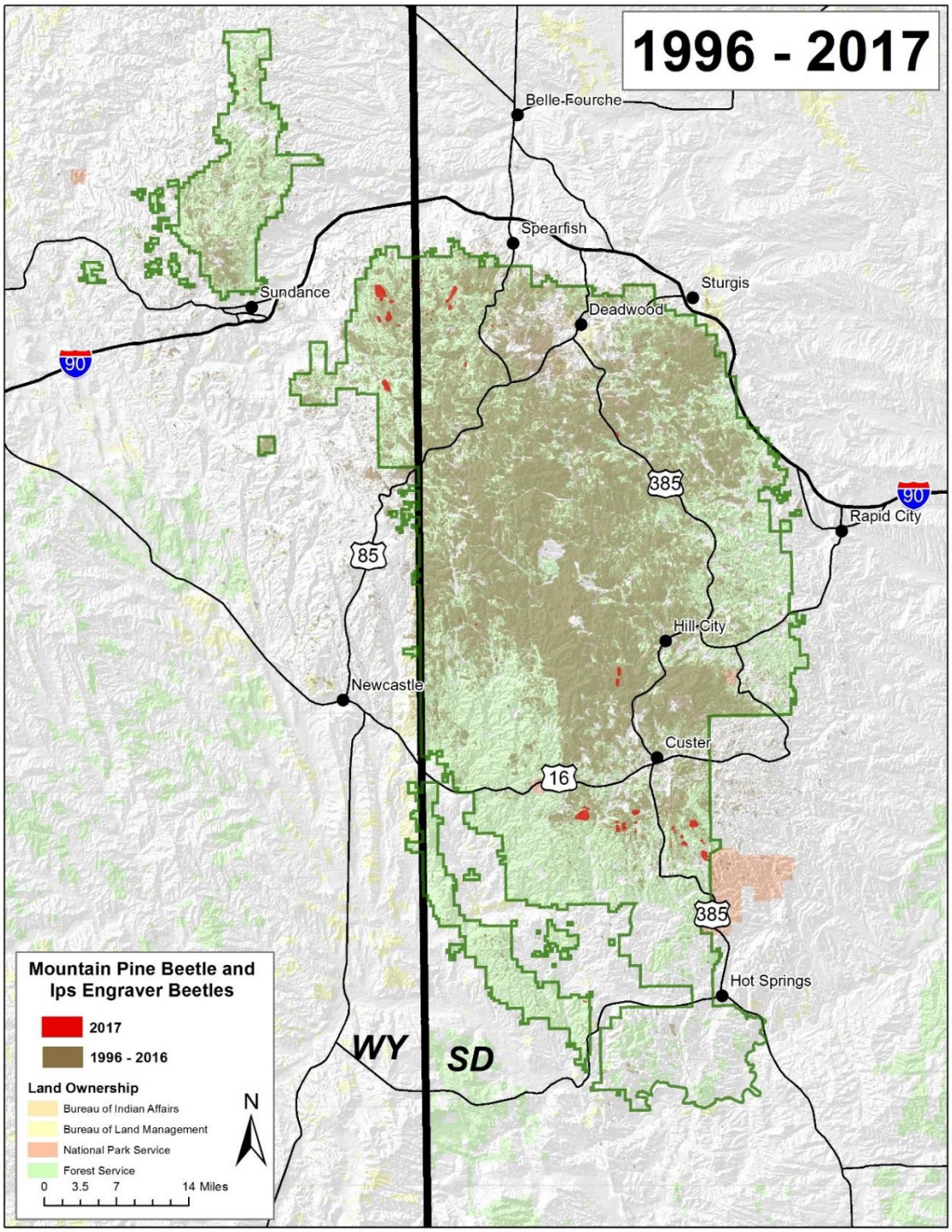

Figure 2. Mountain pine beetle and ips engraver beetle activity on the Black Hills National Forest 1996-2017.

Mountain pine beetle brood were difficult to find. Five locations were sampled in late June 2017 to assess beetle population status (Figure 3). Over 90% of the samples had indicators of wood borer activity, which likely is reducing the brood significantly.

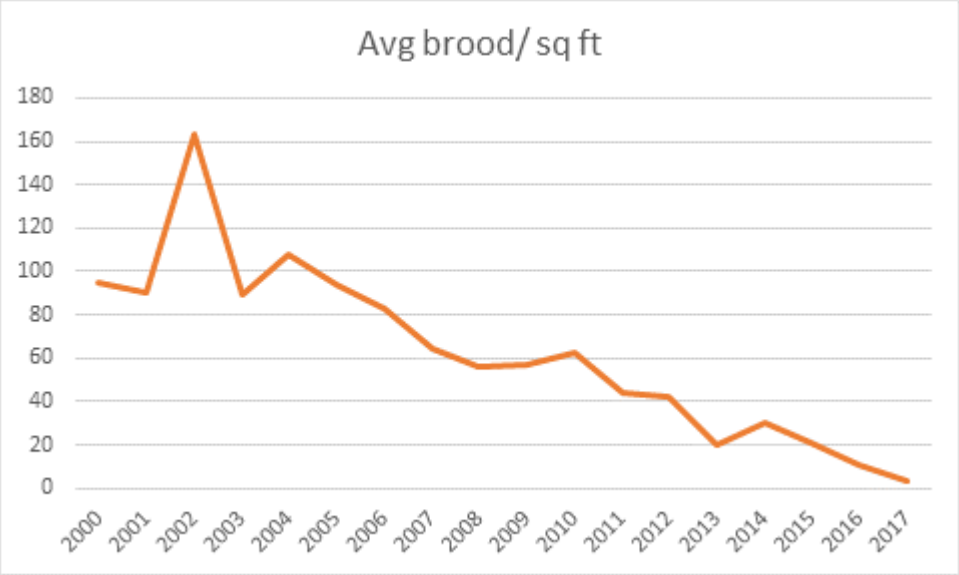

Figure 3. Average brood production per year over the course of the mountain pine beetle epidemic.

Active forest management, such as thinning, combined with sanitation has had a positive effect on the mountain pine beetle epidemic and helps to ensure that the forest is more resilient into the future. Forest managers report timber harvest and commercial thinning have made a difference.

Heavy infestation of pine shoot blight (Diplodia pinea) can be confused in aerial photo interpretation with mountain pine beetle damage. Pine shoot blight is exacerbated by hail injury and trees may or may not recover depending on severity of infection (Figure 4).

Figure 4. Pine shoot blight near Nemo, SD. Photo: Kurt Allen, USDA Forest Service 2017

Spruce mortality was also detected on about 30 acres on white spruce north and west of Deerfield Reservoir. Ground survey shows spruce beetle, spruce ips and Armillaria root disease were all contributing factors (Figure 5).

Figure 5. Spruce mortality cause by a combination of spruce beetle, spruce ips, and Armillaria root disease. Photo: Kurt Allen, USDA Forest Service 2017.